UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/815,360	03/22/2001	Sean T. Boerner	BoernerTrend	4877

54366 7590 02/27/2007
RICK B. YEAGER, ATTORNEY
10805 MELLOW LANE
AUSTIN, TX 78759

EXAMINER	
NGUYEN, NGA B	
ART UNIT	PAPER NUMBER
3692	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/815,360	BOERNER, SEAN T.	
	Examiner	Art Unit	
	Nga B. Nguyen	3692	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Appeal Brief filed on November 2, 2006, which paper has been placed of record in the file.

2. Claims 1-26 are pending in this application.

Response to Appeal Brief

3. In view of the Appeal Brief filed on November 2, 2006, PROSECUTION IS HEREBY REOPENED. A new ground of rejections is set forth below.

4. To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

RICHARD E. CHILCOT, JR.
SUPERVISORY PATENT EXAMINER

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rebane, U.S. Patent No. 6,078,904, in view of Wallman, U.S. Patent No. 6,161,098.

Regarding to claim 1, Rebane discloses a computer- implemented method, for breaking a time series into a plurality of discontinuous trends, the method comprising:

selecting a plurality of sets of trend determination parameters (column 11, line 45-column 12, line 20);

selecting a useful group of sets of trend determination parameters for the time series from the plurality of sets of trend determination parameters, such that the useful group of sets includes at least one member (column 11, line 45-column 12, line 20);

processing the time series with each member of the useful group of sets of trend determination parameters to generate a set of trends and trend attributes for each member (column 11, line 45-column 12, line 20); and

outputting the trends and trend attributes (column 13, line 45-column 14, line 8, edit and review computed portfolio).

Rebane does not disclose inputting time series data, the time series comprising a plurality of data elements, at least a portion of which represents a trend which is

generally increasing or decreasing. However, Wallman discloses inputting time series data, the time series comprising a plurality of data elements, at least a portion of which represents a trend which is generally increasing or decreasing (figures 4-6 and column 13, line 35-column 14, line 62, inputting financial factors scenario). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Rebane's to incorporate the features taught by Wallman above, for the purpose of providing more efficiency in determining portfolio performance.

Regarding to claim 2, Rebane further discloses deciding, based on the composite results of a plurality of the members of the useful group of sets of trend determination parameters, whether the newest data element of the time series represents a continuation of trend such that the trend is increasing, decreasing or flat (column 14, lines 4-8, editing and re-optimizing the portfolio).

Regarding to claim 3, Rebane further discloses inputting time series data further comprises inputting a plurality of time series data sets to a computer; and selecting a particular time series from a plurality of time series data sets (column 12, line 60-column 13, line 27, inputting financial factors scenario).

Regarding to claim 4, Rebane further discloses inputting time series data further comprises inputting a plurality of vector datasets to a computer; and selecting a particular vector data set from a plurality of time series data sets (column 17, lines 10-45).

Regarding to claim 5, Rebane further discloses wherein selecting a particular time series from a plurality of time series data sets further comprises for each of the plurality

of time series data sets: selecting at least a portion of the elements in the data set to create a selected data subset; normalizing the selected data subset to generate a normalized subset for the time series; storing the normalized subset on the computer; calculating, on a processor, the slope of a best-fit polynomial regression through the normalized subset; and selecting a particular time series that has a large absolute slope and a large correlation coefficient between the trend and the data elements (column 15, lines 20-55).

Regarding to claim 6, Rebane further discloses specifying a range of values for each of a plurality of trend determination parameters; and generating the sets of trend determination parameters by selecting unique combinations of trend determination parameter values, such that the values are within the range of values for each of the plurality of trend determination parameters (column 15, lines 1-20).

Regarding to claim 7, Rebane further discloses wherein specifying a range of values for each of a plurality of trend determination parameters further comprises specifying a minimum value for a first trend determination parameter of initial data window size; specifying a maximum value for a first trend determination parameter of initial data window size; specifying a minimum value for a second trend determination parameter of deviation limit; and specifying a maximum value for a second trend determination parameter of deviation limit (column 15, lines 1-20).

Regarding to claim 8, Rebane further discloses specifying a range of potential values for each of a plurality of trend determination parameters; creating an objective function from at least one indications of trend results, such that the objective function

generates a resultant value for a set of trend determination parameters; and selecting a useful group of sets of trend determination parameters by applying an optimization procedure to the objective function and the range of potential values for each of the plurality of trend determination perimeters (columns 23-32).

Regarding to claim 9, Rebane further discloses wherein selecting a useful group of sets of trend determination parameters for the time series from the plurality of sets of time series parameters further comprises for each trend determination parameter set: applying the trend determination parameters to at least a portion of the time series data elements, thereby generating at least one trend and at least one trend attribute parameter; identifying the dynamic trend and at least one dynamic trend attribute parameter; calculating at least one indication of trend results between the time series and the trend set; and storing at least one indication of trend results on the computer; and selecting at least one set of trend determination parameters based on at least one indication of trend results for each of the sets (column 13, line 45-column 14, line 8).

Regarding to claim 10, Rebane further discloses wherein applying the trend determination parameters to at least a portion of the time series data elements thereby generating at least one trend and at least one trend attribute parameter further comprises: assigning each of the data elements to at least one trend by generating a first trend with at least a portion of the data elements; identifying the first trend as the current trend; evaluating each subsequent data element to determine whether the data element is a continuation of the current trend, and assigning the data element to the current trend if it is a continuation of the current trend, and assigning the data element

to a new trend if it is not continuation of the current trend, and identifying the new trend as the current trend; and determining at least one trend attribute for each trend (column 13, line 45-column 14, line 8).

Regarding to claim 11, Rebane further discloses wherein calculating at least one indication of trend results between the time series and trend set further comprises: calculating at last one measure from the group consisting of: the number of trends in the subset of the time series, the RMS Error between the input data values and trend values, the average trend length; the average trend length divided by the minimum number of data points needed to define a trend (window size parameter), the average percent return of the trends, the summed cumulative percent return of the trends; the fraction of correct predictions, the fraction of incorrect predictions, the quotient of the root mean square error and the average length of the trends divided by the minimum number of data points needed to define a trend, and the RMS error, the efficiency of the trends, where efficiency is defined as the average return of the trends divided by the average length of the tends, and compounded return of the tends (column 17, lines 10-47).

Regarding to claim 12, Rebane further discloses wherein selecting at least one set of trend determination parameters based on at least one indication of trend results for each of the sets further comprises plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and its associated trend results, where a first axis represents a first measure of trend results and a second axis represents a second measure of trend results; and selecting from the graph at least one

data point that represents a trend determination parameters set that has desirable trend results (see figure 9).

Regarding to claim 13, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters, where the y-axis represents the product of the root mean square error and the deviation limit for the set of trend determination parameters, and the x-axis represents the average trend length for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a minimum value for the product of the root mean square error and the deviation limit for a given average trend length (see figure 12).

Regarding to claim 14, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters, where the y-axis represents the root mean square error for the set of trend determination parameters, and x-axis represents the

average trend length for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a minimum value for the root mean square error for a given average trend length (see figure 12).

Regarding to claim 15, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters, where the y-axis represents the summed cumulative percent return of the trends for the set of trend determination parameters, and x-axis represents the average percent return for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a maximum value for both the summed cumulative percent return and the average percent return (see figures 7-8).

Regarding to claim 16, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters, where the y-axis represents the summed

cumulative percent return of the trends for the set of trend determination parameters, and x-axis represents the action of correct predictions for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a maximum value for both the summed cumulative percent return and the fraction of correct predictions (column 15, lines 20-55).

Regarding to claim 17, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters, where the y-axis represents the average percent return of the trends for the set of trend determination parameters, and x-axis represents the fraction of correct predictions for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a maximum value for both the average percent return and the fraction of correct predictions (see figure 12).

Regarding to claim 18, Rebane further discloses wherein plotting on a graph a representative data point for each of the plurality of sets of trend determination parameters and their associated trend results and selecting from the graph at least one data point that represents a parameters set that has desirable trend results further comprises: plotting on a graph a representative data point for each of the plurality of

sets of trend determination parameters, where the y-axis represents the average percent return for the trends for the set of trend determination parameters, and x-axis represents the average trend length for the set of trend determination parameters; and selecting at least one set of trend determination parameters associated with a point from the graph that has a maximum value for the average percent return for a given average trend length (see figure 12).

Regarding to claim 19, Rebane further discloses wherein selecting at least one set of trend determination parameters based on at least one indication of trend results for each of the sets further comprises: specifying an objective function that incorporates at least one measure of trend results, such that minimization of the objective function produces desirable trend results'; applying an optimization technique to the objective function such that the optimization technique minimizes the objective function; and selecting at least one set of trend determination parameters as a result of minimizing the objective function (columns 23-32).

Regarding to claim 20, Rebane further discloses wherein processing the time series with each member of the useful group of sets of trend determination parameters to generate a set of trends and trend attributes for each member further comprises for each member applying the trend determination parameters to at least a portion of the time series data elements, thereby generating at least one trend and at least one trend attribute parameter; and identifying the dynamic trend and at least one dynamic trend attribute parameter; and storing at least one dynamic trend attribute parameter on the computer (column 13, lines 25-27).

Regarding to claim 21, Rebane further discloses wherein applying the trend determination parameters to at least a portion of the time series data elements thereby generating at least one trend and at least one trend attribute parameter further comprises: assigning each of the data elements to at least one trend by generating a first trend with at least a portion of the data elements; identifying the first trend as the current tend; evaluating each subsequent data element to determine whether the data element is a continuation of the current trend, and assigning the data element to the current trend if it is a continuation of the current trend, and assigning the data element to a new trend if it is not continuation of the current trend, and identifying the new trend ms the current trend; and determining at least one trend attribute for each trend (column 13, line 45-column 14, line 8).

Regarding to claim 22, Rebane further discloses wherein generating a first trend with at least a portion of the data elements further comprises: recalling the first trend determination parameter, the data window size, from the set of trend determination parameters; forming a proposed trend data set by selecting a number of data elements from the time series, such that the number of data elements selected is at least as large as the value of the data window size trend determination parameter; calculating a first best-fit curve through the proposed trend data set; and identifying the best fit curve as the first trend (column 13, lien 45-column 14, line 8).

Regarding to claim 23, Rebane further discloses wherein evaluating each subsequent data element to determine whether the data element is a continuation of the current trend is further comprises: forming a proposed trend data set from the selected

data elements; calculating a new best-fit curve through the proposed trend data set; calculating at least one measure of predictive error for the new best-fit curve with respect to the values of the data elements in the proposed trend data set; projecting the best-fit curve to the location of the subsequent data element; evaluating the deviation of the subsequent data element from the projected best-fit curve value at the new location; and applying at least one acceptance criteria to the measure of predictive error, and if the acceptance criteria is met setting the subsequent data element to the proposed trend data set, identifying the new best-fit curve ms the current trend, and if the acceptance criteria is not met setting the subsequent data element to a new trend set, determining a new trend, and identifying the new trend as the current trend (column 15, lines 20-55).

Regarding to claim 24, Rebane further discloses wherein calculating at least one measure of predictive error for the new best-fit curve with respect to the values of the data elements in the proposed data set further comprises evaluating the derivative of the best-fit curve; obtaining an estimated value of the best-fit curve at the new element; calculating the residuals between the proposed trend data set and the new best-fit curve; normalizing the residuals; quantifying the spread of the distribution of the normalized residuals; calculating the deviation of predicted trend value at the new element from the actual value of the new element; and normalizing the deviation of predicted trend value at the new element from the actual value of the new element using the spread of the distribution of normalized residuals (columns 23-32).

Regarding to claim 25, Rebane further discloses wherein applying at least one acceptance criteria to the measure of predictive error further comprises: designating a first test criterion as true if the sign of the derivative of the trend curve generated through the proposed trend dataset changes compared to the sir of the derivative of the trend curve generated previously; designating a second test criterion as true if the absolute value of normalized deviation exceeds the deviation limit parameter; designating a third test criterion as true if the absolute value of normalized deviation exceeds the deviation limit parameter and the normalized deviation is in the opposite direction œs the direction of the trend as designated by the derivative of the trend curve through the proposed trend dataset; designating a fourth test criterion as true if the correlation coefficient between the proposed trend curve and the proposed trend data set decreases below the correlation limit parameter; designating a fifth test criterion as true if the number of times that the absolute value of normalized deviation exceeds the deviation limit parameter; and the normalized deviation is in the opposite direction as the direction of the trend as designated by the derivative of the trend curve through the proposed trend dataset; exceeds the number of values parameter; designating a sixth test criterion as true if the absolute value of the normalized deviation from a flat trend exceeds the flat trend deviation limit; and determining whether at least one of the first, second, third, fourth, fifth, and sixth test criteria is true (columns 23-32).

Claim 26 is written in means and contains similar limitations found in claims 1-25 above, therefore, is rejected by the same rationale.

Conclusion

7. Claims 1-26 are rejected.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Nga B. Nguyen whose telephone number is (571-272-6796. The examiner can normally be reached on Monday-Thursday from 9:00AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard E. Chilcot can be reached on (571) 272-6777.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-3600.

9. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

C/o Technology Center 3600

Washington, DC 20231

Or faxed to:

(703) 872-9306 (for formal communication intended for entry),

or

(571) 273-0325 (for informal or draft communication, please label "PROPOSED" or "DRAFT").

Hand-delivered responses should be brought to Knox building, 501 Dulany Street, Alexandria, VA, First Floor (Receptionist).

NGA NGUYEN
PRIMARY EXAMINER

February 14, 2007